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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/023,109	12/14/2001	Jakob Nielsen	58683-00002USPX	2393

7590 03/24/2005

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EXAMINER

LAO, LUN S

ART UNIT

PAPER NUMBER

2643

DATE MAILED: 03/24/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/023,109

Applicant(s)

NIELSEN ET AL.

Examiner

Lun-See Lao

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 08 December 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-43 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-43 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Introduction*

1. This action is response to the amendment filed on 12-08--2004. Claims 1, 4-7, 10, 16, 19-24, and 42-43 have been amended and claims 1-43 are pending.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1,16 and 42-43 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The driven "means for determining, base on a single select function, a filtering function for each signal path such that a product of the transfer function and the filtering function is the selected function; and means for applying the filtering function to the corresponding signal path, thereby correcting the transfer function of the signal path to the selected function, whereby the output signals from the signal paths are substantially equal with respect to phase or phase and magnitude " ( see specification page 3 line 13-page 7 line 21) was not supported in the further detail in the specification nor in any of the claim.

***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-6, 10, 16-21, 28 and 33-43 are rejected under 35 U.S.C. 102(b) as being anticipated by Gardner (US PAT. 5,737,433).

Consider claims 16 and 43 Gardner teaches an apparatus for equalizing output signals from a plurality of signal paths, the apparatus comprising of:

(a) means for identifying a transfer function (see fig.3, (42,43)) of the signal path inherently (because, a microphone connects to a channel for picking up a signal from (see fig.3,  $(r_1^{(i)}(n), \dots, r_{mj}^{(i)}(n))$  and see col.2 lines 7-22)) including a microphone for each of the signal paths;

(b) means (42, 43) for determining, base on a single select function (such as FIR), a filtering function (42,43) for each signal path such that a product of the transfer function and the filtering function is the selected function (see col.7 line 1-col.8 line 35); and

(c) means (42,43) for applying the filtering function (FIR) to the corresponding signal path, thereby correcting the transfer function of the signal path to the selected function , whereby the output signals from the signal paths are substantially equal with respect to phase or phase and magnitude (see col.7 line 1-col.8 line 35).

As to claims 1 and 42, these are method claims of claims 16 and 43 and thus note the rejections of claims 16 and 43, respectively.

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Consider claims 17-18, Gardner teaches an apparatus of the selected function is the transfer function (see fig.3, (42-43)) for one of the signal paths (see col.7 line 1-col.8 line 35); and an apparatus of the filtering function is determined such that a product of the transfer function and the filtering function is a common factor (such as weights and see fig.3, (42,43) and col.7 line 1-col.8 line 35).

As to claims 2-3, these are method claims of claims 17-18 and thus note the rejections of claims 17-18, respectively.

Consider claims 19-20 Gardner teaches an apparatus the filtering function applying means comprises:

- (a) a filter (see fig.3, 42, 43) provided to the signal path; and
- (b) means (42,43) for applying the filtering function to the filter (42,43) for its corresponding signal path, thereby equalizing (42) output signals from the filter (42,43) of the signal paths (see col.7 line 1-col.8 line 35); and an apparatus of the transfer function identifying means comprises:

- (a) means (such as analog-to-digital converters) for providing a sample signal to the signal path to produce a sample output signal through the signal path; and

- (b) means (such as analog-to-digital converters) for processing the sample signal and the sample output signal to identify the transfer function of its corresponding signal path (see col.7 line 1-60).

As to claims 4-5, these are method claims of claims 19-20 and thus note the rejections of claims 19-20, respectively.

Consider claim 21, Gardner teaches an apparatus of the signal path comprises the microphone for converting a sound signal to an electrical analog signal; and an analog-to-digital converter coupled to the microphone for converting the electrical analog signal into a digital signal, wherein said transfer function identifying means comprises (see col.7 lines 1-60):

(a) means (see fig.3,  $(r_1^{(i)}(n), \dots, r_{mj}^{(i)}(n))$ ) for providing a noise sample to the microphone inherently (because, a microphone connects to a channel for picking up a signal from (see fig.3,  $(r_1^{(i)}(n), \dots, r_{mj}^{(i)}(n))$ ) and see col.2 lines 5-20) to produce a sample output signal through the signal path; and

(b) means (see fig.3,  $(r_1^{(i)}(n), \dots, r_{mj}^{(i)}(n))$ ) for processing the noise sample and the sample output signal to identify the transfer function of its corresponding signal path (see col.7 line 1-col.8 line 35).

As to claim 6, there is method claim of claim 21 and thus note the rejection of claim 21.

Consider claim, 28 Gardner teaches the transfer function (see fig.3, 43, 42) of the signal path is a transfer function of said microphone inherently (because, a microphone connects to a channel for picking up a signal from (see fig.3,  $(r_1^{(i)}(n), \dots, r_{mj}^{(i)}(n))$ )) (see col.2 lines 7-22 and col.7 1-60).

As to claim 10, there is method claim of claim 28 and thus note the rejection of claim 28.

Consider claims 36-38 Gardner teaches an apparatus is comprising a listening device; and hearing aid (ear covers or cups), and headset (see col.2 lines 7-22).

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As to claims 33-35, these are method claims of claims 36-38 and thus note the rejections of claims 36-38, respectively.

Consider claims 39-41 Gardner teaches a hearing aid (a listening device and a headset) comprise a signal equalization (see fig.3, (42,43) and col.2 lines 7-22 and col.7 lines 1-60).

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 7, 10-11, 15, 22, 28-29, 31 and 33-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gardner (US PAT. 5,737,433) in view of Chabries (US PAT. 4,658,426).

Consider claim 22, Gardner teaches an apparatus according of the signal path comprises the microphone for converting a sound signal to an electrical analog signal; and an analog-to-digital converter coupled to the microphone for converting the electrical analog signal into a digital signal, wherein said transfer function identifying means comprises (see col. 7 line 1-60); but Gardner does not clearly teach

(a) means for acoustically providing a noise sample to the microphone with a propagation time delay to produce a first output processed through the signal path;

(b) means for providing a second output corresponding to the noise sample with the propagation time delay; and

(e) means for processing the first output and the second output to identify the transfer function of its corresponding signal path.

However, Chabries teaches (a) means (speaker) for acoustically providing a noise sample to the microphone (see fig.1, 54,56) with a propagation time delay to produce a first output processed through the signal path;

(b) means (speaker) for providing a second output corresponding to the noise sample with the propagation time delay; and

(e) means (speaker) for processing the first output (54,56) and the second output (54,56) to identify the transfer function (adaptive filter, 52) of its corresponding signal path (see col.4 lines 13-62 and col.9 line 16-col.10 line 48).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Chabries into Gardner to provide a device adapted to filter background noise from speech in real time so as to improve speech intelligibility.

As to claim 7, there is method claim of claim 22 and thus note the rejection of claim 22.

Consider claim, 28 Chabries (426) teaches the transfer function (see fig.9, 40, 42) of the signal path is a transfer function of said microphone (2 and see col.13 line 24-54).

As to claim 10, there is method claim of claim 28 and thus note the rejection of claim 28.



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Consider claims 29, 31 Chabries (426) teaches an apparatus the propagation delay time is selected to be integer multiple of said first noise sample (see col.2 line 53-col.3 line56); and the said first and second digital noise signals (x,y) are a random noise signal (background noise and see col.2 line 30-col.3 line56).

As to claims 11 and 15, these are method claims of claims 29 and 31 and thus note the rejections of claims 29 and 31, respectively.

Consider claims 36-38 Chabries (426) teaches an apparatus is comprising a listening device; and hearing aid, and headset (earphone)(see col.13 lines 23-54).

As to claims 33-35, these are method claims of claims 36-38 and thus note the rejections of claims 36-38, respectively.

7. Claims 8, 12, 23 and 25, 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gardner (US PAT. 5,737,433) as modified by Chabries (US PAT.4,658,426) as applied to claims 1-7 and 16-22 above, and further in view of Brainard, II (US PAT. 6,048,320).

Consider claim 23, Chabries teaches an apparatus of the noise sample providing means comprises:

Means (see fig.1, 56, reference signal converting to adaptive filter) for converting the first digital noise signal into said noise sample (see col.4 lines 15-62), but Gardner and Chabries does not teach a first noise generator for generating a first noise signal.

However, Brainard teaches an apparatus of the noise sample providing means comprises:

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(a) a first noise generator(see fig.2, 32) for generating a first noise signal; and  
(b) means (see fig.2,14) for converting the first digital noise signal into said noise sample (see col.3 lines 33-62).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Brainard into the teaching of Gardner and Chabries provide the apparatus is controlled by a processor. The processor is adapted to generate the source signal which will preferably contain pseudo- random noise.

As to claim 8, there is method claim of claim 23 and thus note the rejection of claim 23.

Consider claim 25 Brainard teaches an apparatus of the first digital noise signal providing means is a maximum length sequence generator (see fig.2, 32 and col.3 lines 33-62 and col.5 lines 50-53).

As to claim 12, there is method claim of claim 25 and thus note the rejection of claim

Consider claim 26 Chabries (426) teaches an apparatus of the converting means includes a digital-to-analog converter (see fig.9 8) and a loud speaker (10 and see col.13 line 24-54).

8. Claims 9, 12-13, 15 and 24-25, 27, 31-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gardner (US PAT. 5,737,433) and Chabries (US PAT.4,658,426) as modified by Brainard, II (US PAT. 6,048,320) as applied to claims 1-8 and 16-23 above, and further in view of Belmonte (US PAT. 3,997,764).

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Consider claim 24 Chabries (426) teaches an apparatus of a second output providing means comprises:

means for delaying the second digital noise signal (y) by same amount of time as said propagation delay time (see col.2 line 30-col.3 line 56); and

means for compensating the conversion factor (weighted) of said first digital noise signal (x) into said noise sample (see col.2 line 30-col.3 line 56), but Chabries fails to teaches a second noise generator for generating a second digital noise signal, the second digital noise signal being synchronized with said first digital noise signal and having properties corresponding to said first digital noise signal.

However, Belmonte teaches a second noise generator(see fig.4, 22 (pseudo-random noise generators)) for generating a second digital noise signal, the second digital noise signal being synchronized (by a clock frequency  $f_0$ ) with said first digital (see col.4 lines 11-31).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Belmont into the teaching of Gardner, Chabries and Brainard provide the hearing enhancement apparatus process signal.

As to claim 9, there is method claim of claim 24 and thus note the rejection of claim 24, respectively.

Consider claims 25, 27, Belmont teaches an apparatus of the first (see fig.4, 14) digital noise signal providing means is a maximum length sequence (pseudo-random

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noise) generator; and the second digital noise providing means (see fig.4, 22) includes a maximum length sequence (pseudo-random noise) generator (see col.4, line 11-31).

As to claims 12-13, these are method claims of claims 25 and 27 and thus note the rejections of claims 25 and 27, respectively.

Consider claims 31-32, Belmonte teaches the said first and second digital noise signals are a random noise signal (see fig.4, 14,22 (pseudo-random noise)). and an apparatus of the first (see fig.4, 14) and second digital noise signals (see fig.4,22) are provided by a single source ((pseudo-random noise) and see col.4 lines 11-31).

As to claim 15, there is method claim of claim 31 and thus note the rejection of claim 31, respectively.

9. Claims 14, 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gardner (US PAT. 5,737,433) and Chabries (US PAT.4,658,426) as modified by Brainard, II (US PAT. 6,048,320) and Belmonte (US PAT. 3,997,764) as applied to claims 1-9 and 16-24 above, and further in view of Fang et al (US PAT. 6,480,610).

Consider claim 30, Belmonte to teach an apparatus of the first and second digital noise signals are a noise signal (see fig.4, 14, 22 (pseudo-random noise)), but Belmonte does not teach a white noise signal.

However, Fang teaches a white noise signal (see fig.5 583, (white noise generator)) (see col.7 line 25-col.8 line 29).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Fang into the teaching of Gardner, Chabries, Brainard and Belmonte provide the most suitable type of noise for training.

As to claim 14, there is method claim of claim 30 and thus note the rejection of claim 30.

### ***Response to Arguments***

10. Applicant's arguments with respect to claim 1-43 have been considered but are moot in view of the new ground(s) of rejection.

Applicant argued that Chabries (426) does not address unmatched signal path, each having a microphone. (remarks page 12, first paragraph).

The examiner respectfully disagrees. Chabries(426) teaches processing noise (see fig.1, 56 (reference)) to identify the transfer function(52) of a signal path including a microphone (56 and see col.4 lines 30-40). It meets the limitation of the claim recited.

Applicant argued that Chabries (426) does not use "delay" for matching a plurality of signal paths. (remarks page 12, second paragraph).

The examiner respectfully disagrees. Chabries(426) teaches that using "delay" for matching a plurality of signal paths. (see figs 5-7 and col.9 line 16-col. 10 line 48). It meets the limitation of the claim recited.

### ***Conclusion***

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Marash (US PAT. 5,825,898) is cited to show other listening device.

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12. Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

or faxed to:(703) 872-9306

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington.

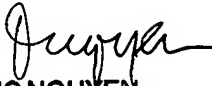
VA., Sixth Floor (Receptionist).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lao,Lun-See whose telephone number is (703) 305-2259. The examiner can normally be reached on Monday-Friday from 8:00 to 6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Curtis Kuntz, can be reached on (703) 305-4708.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 whose telephone number is (703) 306-0377.

Lao,Lun-See  
Patent Examiner  
US Patent and Trademark Office  
Crystal Park 2  
(703305-2259)

  
**DUC NGUYEN**  
**PRIMARY EXAMINER**